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ABSTRACT

Three Canadian teachers (an English language first grade teacher, a French immersion first grade teacher, and a grade four/five teacher of students with special needs) used an action research framework and a multidimensional model of teaching to study and expand their literacy strategies and watch the effects on their students. The model they used, the Picture Word Inductive Model, was designed as a major component of language arts curricula for primary level beginning readers and older beginning or early-stage readers. Based on several lines of research on instructional strategies and promoting growth in reading and writing, the model contains various tools to help teachers study students' progress as they come into literacy. The model structures cycles of inquiry by students, generally 2-6 weeks long, with the pace and specific lesson content determined by the teacher's daily diagnosis of student performance. Students begin by describing a picture, then receive a set of word cards. Students classify words, discuss captions on photographs, generate titles and sentences, receive new vocabulary words, classify sentences, and generate paragraphs, always moving at their own pace. The teachers found that students made substantial gains in vocabulary, reading skills, and reading comprehension. (SM)

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Teacher (and District) Research: Three Inquiries into the Picture Word Inductive Model

A paper presented to the annual meeting of the AERA
Seattle, Washington
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Three teachers in Alberta, Canada -- one English language first grade teacher, one French immersion first grade teacher, and one grade four/five teacher of students with special needs -- used an action research framework and a multidimensional model of teaching to study and expand their literacy strategies and to watch the effects on their students.

We invite you to share our inquiry into the teaching of literacy. Three of us (Tracy, Nicole, and Lisa) are part of a group of over 50 teachers and administrators who are trying to form a bridge between the external knowledge base and the conduct of research into curriculum and instructional practices in our classrooms and schools. District office staff support us in and encourage us to replicate studies and implement strategies that are effective with students, whether they come from within the province or beyond. They work steadily to strengthen the professional development of our group, and to expand membership, through demonstrations, discussions, and modeling the inquiry process.

In the Northern Lights School Division No. 69, we began our collective work by studying a model of teaching that seemed to have potential for increasing the effectiveness of our primary literacy curriculum and our attempts to help upper elementary and secondary students who read poorly. This model, the *Picture Word Inductive Model* (see, Calhoun, 1999), was designed as a major component of language arts curriculums for primary level beginning readers and older (grades three to twelve) beginning or early-stage readers. Based on several lines of research on instructional strategies and on promoting growth in reading and writing, the model also contains a number of tools to help teachers study students' progress as they come into literacy. In fact, using the *Picture Word Inductive Model* (PWIM) effectively requires an action research frame of reference, for you don't just adopt or buy into PWIM, you inquire into its theory and rationale, its structure, and its effects on your students.

Describing the Moves in the Picture Word Inductive Model

We have come to use PWIM to support a multidimensional curriculum for teaching beginning reading and writing and for teaching information and concepts in social studies and science. The model structures cycles of inquiry by students, generally two to six weeks long, with the pace and specific content of lessons determined by the teacher's daily diagnosis of student performance.

The sequence of lessons in a PWIM cycle begins with a picture, usually a photograph, whose contents, both the central elements and details, include many things that students can describe

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using their current listening-speaking language. The students study the picture and then "shake out the words". What this means is that the students identify things they see in the picture; and the teacher draws a line from those things to a place outside the picture, reiterates the word, and writes and spells the word or phrase aloud. The students repeat the word and its spelling. What emerges is an illustrated picture-word dictionary. For example, Nicole, working with 26 Grade One French Immersion students, selected a seasonal winter picture with three children building a snowman. These are the words her students shook out of the picture:

forêt épaisse (dense forest)	oeil (eye)	carotte (carrot)
pantalon (pants)	ciel bleu (blue sky)	boule de neige (snowball)
bouton (button)	foulard (scarf)	bonhomme de neige (snowman)
ombre (shadow)	grosse roche (big rock)	botte (boot)
manteau (coat)	montagne enneigée (snow-covered mountain)	
oreille (ear)	branche brune (brown branch)	jeans (jeans)
neige (snow)	gazon (grass)	tuque (toque)
garçon (boy)	renne (reindeer)	neige qui brille (shining snow)
forêt (forest)	colline (hill)	colline de ski (ski hill)
gant (glove)		

Of note: Thus far in our inquiry in Northern Lights School Division No. 69, PWIM appears to be an instructional approach that rapidly accelerates literacy learning for beginning readers of English and French, and for "overage" beginning readers.

The next phase of PWIM involves providing students with their own sets of word cards. Students practice reading their words: they may "recognize" them immediately, decode them, or use the picture-word dictionary. It's easy for us to assess students' ability to read the words as we move among the students. As students begin to read the words, the next phase of the model comes into play: students classify the words in terms of phonetic, structural, or content properties and share their categories and why they put a particular set of words together. The categorization activity occurs several times during the PWIM cycle. Here are a few of the categories students generated from the words above: grosse roche, branche brune, forêt épaisse ("they all have two words"); forêt épaisse,. forêt, enneigée ("they have accents - ê, é"), épaisse, fille, carotte, grosse, botte, enneigée, oreille, renne, colline ("all have two consonants, just alike, together"). From among the categories formed by students and available in this set of words, three of the categories selected by Nicole for explicit instruction include: words containing two of the same consonants, side by side; words ending with /on/ sound and spelling; and words containing the sound /on/ but spelled /om/ if followed by a b or p.

The pace of lessons during a picture word cycle depends on the reading level of the students, the curriculum objectives of the teacher, and what students can see and articulate about how the language works. In the PWIM sequence, lessons in which students classify words or explicit instruction mini-lessons on word properties may occur many times, but not necessarily one after another. After students have had some work reading and classifying the words, we work with them on the meaning of titles and sentences. We do this as part of our read-aloud time as well as during our PWIM lessons. We talk about the titles of nonfiction books and what they promise to

readers; we discuss the captions on photographs; we think about the relationship between titles and first sentences in nonfiction books we are sharing. Using these "models" of titles and sentences, we ask students to generate titles that match the picture and factual sentences about the picture. New words from the sentences are added to our students' vocabulary banks.

Studying the picture described earlier, Nicole's students generated 14 titles and 26 sentences. Here are some of their titles: Les enfants et le bonhomme de neige (The Children and the Snowman); Le bonhomme de neige (The Snowman); Une belle journée pour jouer dans la neige (A Nice Day To Play in the Snow); Le bonhomme de neige des enfants (The Children's Snowman). And here are a few of their sentences:

*Le bonhomme de neige a une carotte pour le nez.
(The snowman has a carrot for a nose.)

*Les enfants font un bonhomme de neige.
(The children are making a snowman.)

*Le bonhomme de neige a un foulard.
(The snowman has a scarf.)

*La fille met de la neige sur le bonhomme de neige.
(The girl is putting snow on the snowman.)

*Le bonhomme de neige a des boutons pour les yeux.
(The snowman has buttons for eyes.)

*Le bonbomme de neige a des mitaines.
(The snowman has mittens.)

Just as with the words, the teacher and students work with a class set of large sentence strips, and students have their own smaller-sized sets of sentences.

As soon as students begin to read the sentences, they are asked to classify them (however they wish, by content or common patterns of syntax or structure) into groups and provide reasons for their classifications (and eventually, titles for their sets). Tracy and Nicole both develop small books that publish the sentences and that students can share with parents for reading practice and as celebrations of what they are learning.

Some of Nicole's students formed groups of sentences based on how the sentences began. Here are a few examples: several students grouped the four sentences beginning with "La fille..." (The girl) into a set; others formed a set with the eight sentences beginning with "Le bonhomme

de neige..." (The snowman); others with the five sentences beginning with "Les enfants..." (The children). Other students, and later some of these same students, put together groups of sentences that "tell about building the snowman"; "these tell what the children are doing outside"; and "these tell about the parts of the snowman".

Moving along in the PWIM cycle, the teacher selects one of the students' sentence categories (a content category such as "parts of the snowman" not a structural category such as how many words are in the sentence or how it begins) and models writing a well-organized paragraph, sharing her thinking about how she used the ideas in the sentences and modified the sentence, if needed, to form the message about the picture that she wished to share with her readers. In whatever way is appropriate to the developmental level of the students (e.g., a combination of drawing and writing, pieces dictated to an older student buddy), students are asked to use other categories and generate their own paragraphs.

Studying the Theory and Rationale of PWIM

As we studied the model and its moves and sequence and worked on using it with our students, we discovered that the rationale for the *Picture Word Inductive Model* has several dimensions and goals.

*The acquisition of sight-vocabulary is a major goal, and the rationale is that the most direct route is from the already developed listening/speaking vocabulary of students. In addition, spelling provides the attributes by which words are recognized, and the see-say-spell pattern is used throughout the PWIM sequence until students master both reading and spelling the word automatically.

*Today, it is again recognized that the development of sight vocabulary is one of the essential channels to literacy (Ehri, 1999). The problem of retention of words and how to move them into long-term memory is addressed, as well as making these words available for the study of how the English alphabet works (Swanborn and de Glopper, 1999; Graves, 1992; Adams and Huggins, 1985).

*Categorization of the words by phonetic and structural properties increases mnemonic force for both reading and spelling the words.

*Categorization enables students to arrive at phonetic and structural analysis generalizations.

*The model includes both inductive processes and explicit instruction processes. While the model is designed to capitalize on students' ability to think inductively, teachers may select any word, a category of words, a phonics generalization, a structural analysis generalization, a sentence structure, or a paragraph structure for explicit instruction on concepts or processes being taught in other components of the language arts curriculum.

*The illustrated dictionary provides a reference that can be used repeatedly, can be used to help students carefully study the properties of a word so they know only those letters in that order

spell that particular word, and can be used in teaching students to use reference sources.

*Sentences are generated as part of observing the picture and determining what can be said, based on present evidence, and how to best convey that observation in words. Thus, activities with both words and sentences provide practice in writing and the synthesis of ideas, with special attention given to writing accurate nonfiction prose.

One aspect of the rationale and design that we did not fully understand until we had taught several PWIM cycles and thought about student responses was that both the mechanics of reading and writing (letter recognition, letter formation, sounds, correct spelling, syntax, sentence structure, punctuation, etc.) and the meaning-making processes of reading and writing as active forms of communication permeate the design of the model. Eventually, this aspect became the larger lens through which we designed the lessons within the cycle.

Research on inductive teaching has generally shown considerable effect on the development of concepts but lesser effects on the acquisition and retention of knowledge (Joyce, Weil, and Calhoun, 2000). Essentially, the question is what types of concepts do students develop through the activity of classifying? Do they begin to develop conceptual control over phonetic and structural attributes of words so that they can use that control as they encounter unfamiliar words? We are continuing to study this aspect of PWIM.

ONE WEEK RETENTION OF WORDS

WORDS	S.1	S.2	S.3	S.4	S.5	S.6
forêt épaisse						
ciel bleu		✓			✓	✓
fille	✓	✓	✓	✓	✓	✓
boule de neige		✓			✓	✓
oeil	✓	✓	✓	✓	✓	✓
bouton		✓				
carotte					✓	✓
foulard		✓				✓
gant		✓			✓	✓
bonhomme de neige		✓				✓
pantalon		✓				
ombre		✓				
grosse roche						
branche brune	✓	✓			✓	
botte		✓				
jeans		✓			✓	
mitaine		✓				
neige	✓	✓			✓	✓
cheveux	✓	✓	✓		✓	✓
gazon		✓			✓	
manteau		✓			✓	✓
tuque		✓			✓	
montagne enneigée						
garçon	✓	✓		✓	✓	✓
oreille	✓	✓			✓	✓
renne		✓			✓	
neige qui brille		✓				
arbres	✓	✓			✓	✓
forêt						
colline enneigée						
colline						
vert	✓	✓	✓	✓	✓	✓
colline de ski						
nuage						

RETENTION OF WORDS AT THE END OF MODEL

WORDS	S.1	S.2	S.3	S.4	S.5	S.6
forêt épaisse	✓	✓		✓	✓	✓
ciel bleu	✓	✓	✓	✓	✓	✓
fille	✓	✓	✓	✓	✓	✓
boule de neige	✓	✓		✓	✓	✓
oeil	✓	✓	✓	✓	✓	✓
bouton	✓	✓		✓	✓	✓
carotte	✓	✓	✓	✓	✓	✓
foulard	✓	✓		✓	✓	✓
gant	✓	✓		✓	✓	✓
bonhomme de neige	✓	✓	✓	✓	✓	✓
pantalon	✓	✓		✓	✓	✓
ombre	✓	✓		✓	✓	✓
grosse roche		✓		✓	✓	✓
branche brune	✓	✓		✓	✓	✓
botte	✓	✓		✓	✓	✓
jeans		✓	✓		✓	✓
mitaine	✓	✓		✓	✓	✓
neige	✓	✓	✓	✓	✓	✓
cheveux	✓	✓	✓	✓	✓	✓
gazon	✓	✓	✓	✓	✓	✓
manteau	✓	✓	✓	✓	✓	✓
tuque	✓	✓	✓	✓	✓	✓
montagne enneigée	✓	✓		✓	✓	✓
garçon	✓	✓		✓	✓	✓
oreille	✓	✓	✓	✓	✓	✓
renne	✓	✓		✓	✓	✓
neige qui brille	✓	✓		✓	✓	✓
arbres	✓	✓		✓	✓	✓
forêt	✓	✓		✓	✓	✓
colline enneigée	✓	✓		✓	✓	✓
colline	✓	✓	✓	✓	✓	✓
vert	✓	✓	✓	✓	✓	✓
colline de ski	✓	✓	✓	✓	✓	✓
nuage	✓	✓		✓	✓	✓

Here are Nicole's reflections on student progress in learning the words in the sentences and titles taken from her PWIM implementation log.

Reflections on Sight Word Acquisition (Nicole)

At the end of the PWIM cycle, we tested students on their accuracy and fluency in reading the sentences and titles given with this picture. Except for one student, they did super. I feel this was our best PWIM so far, as I felt and saw all the progress and growth my students did. We also did a lot more with the writing.

Here is the picture of student performance of the six students I studied most systematically:

Student #1 knew 99% of the words in the sentences and 98% of the words in the titles.
Student #2 knew 99% of the words in the sentences and 100% of the words in the titles.
Student #3 knew 73% of the words in the sentences and 70% of the words in the titles.
Student #4 knew 98% of the words in the sentences and 98% of the words in the titles.
Student #5 knew 100% of the words in the sentences and 99% of the words in the titles.
Student #4 knew 98% of the words in the sentences and 95% of the words in the titles.

Student #3 is not doing as well as the rest of them, but he has made quite a jump since the first few cycles, from 1/4 to 1/2 more words recognized. I am anxious to see the results of the next PWIM.

Looking across our PWIM implementation logs for 1999-2000, each of us reported considerable quantities of words generated and retained by our students. In one case, more than 200 words were encountered in the first four months, and 90 percent of the students were able to recognize them automatically six months later. In Nicole's French Immersion class, nearly five hundred words were identified in the first semester, and all except one student recognized 95 percent of them five months later. Lisa--who uses the division's *Read to Succeed* program with her students, and six of its seven components are included in full use of PWIM--studied the sight word retention rate of her special needs students. In November, she assessed students' automatic recognition of words studied during the first three months of school and in March assessed retention rate again. See Figure 2 for the results of Lisa's study of students' long-term retention.

Figure 2
Retention of Words from September 1999 to March 2000

(Lisa's special education students generated and studied 182 words from four cycles of PWIM. This includes words from the pictures, sentences, and titles.)

	November Testing	March Testing
Student #1.	179/182	180/182
Student #2	72/182	48/182
Student #3	180/182	177/182
Student #4	167/182	155/182
Student #5	180/182	182/182
Student #6	140/182	141/182
Student #7	180/182	Unable to Test (Poor Attendance in General)
Student #8	170/182	171/182
Student #9	178/182	179/182

At Grade One, we (Tracy and Nicole) do not administer standardized, norm-referenced reading tests. However, we do have these results for upper elementary regular and special needs students. Table 1 and its commentary provide an example of the data organization and analysis of standardized test data results from Lisa's Grades Four/Five Class in which PWIM is a major part of language arts instruction. The commentary illustrates the type of data use and reflection that are beginning to occur across our professional development community in Northern Lights.

Table 1
Pre and Post-Test CTBS Vocabulary and Comprehension Scores
for 16 Section M Students

Section M								
Student #, Gender	**Grade**	**Length**	**Vocabulary (GLE)**			**Comprehension (GLE)**		
			Initial	**Final**	**Gain**	**Initial**	**Final**	**Gain**
1. F	5	9	2.3	4.4	2.1	2.9	4.9	2.0
2. F	5	9	1.9	4.3	2.4	2.9	4.6	1.7
3. M	5	9	1.7	4.2	2.5	1.4	5.0	3.6
4. M	5	5	3.3	3.9	0.6	3.0	4.8	1.8
5. M	5	9	1.4	4.3	2.9	3.0	4.7	1.7
6. M	5	5	2.8	2.9	0.1	3.2	3.7	0.5
7. M	5	5	1.9	4.0	2.1	2.1	3.5	1.4
8. M	5	9	2.3	4.3	2.0	3.5	4.8	1.3
9. M	4/5	7	3.9	3.3	(-0.6)	3.0	4.1	1.1
10. M	4/5	5	3.1	4.1	1.0	4.8	5.1	0.3
11. F	4/5	5	3.6	4.4	0.8	3.0	4.6	1.6
12. M	4/5	5	2.6	3.0	0.4	2.9	3.5	0.6
13. F	4/5	5	4.5	4.9	0.4	3.3	5.1	1.8
14. M	4/5	9	3.9	4.9	1.0	2.7	5.3	2.6
15. M	4/5	5	2.3	3.0	0.7	2.4	3.6	1.2

All of these students made substantial gains on the Vocabulary subtest, the Comprehension subtest, or both subtests of the Canada Tests of Basic Skills. In this class, there were just four females; thus, there is a big gender difference in enrollment, but no gender difference appears in effects. The mean gain on the Vocabulary subtest was 1.2, and the mean gain on the Comprehension subtest was 1.5. Gains relative to initial scores are particularly interesting. The initial scores for six students were in the average range of end-of-first-grade students (1.7-2.3). The average gain for this subgroup of students was 2.1. In their previous four or five years of schooling, the average gain for these six students had been around 0.25 per year, and the prognosis that that level of gain would rise would normally be poor (Juel, 1992).

During this school year, the student gains were twice the gain of average students for a year, and eight times their own previous average annual gain. For most of these students, another year of this magnitude of gain would bring them to where they "look like" average students, at least from a test-score perspective. As it is, they have experienced a year of considerable growth and have reached a level in reading where, with effort, they can manage typical upper elementary grade academic tasks. Our survey of parents and students generated results that confirmed the standard test results: students believe they have progressed and so do their parents and caregivers.

A Positive and Productive Message

Three teacher-researchers, studying how to improve language learning, implementing alternatives in their classrooms, and making the results public, demonstrate that when a district provides sufficient opportunities to study (15 days during the year for these teachers), the research-to-practice paradigm has much promise. In addition, they demonstrate that adding a new language development strategy (PWIM) to their repertoires has paid off for their students and for themselves.

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